Milicia excelsa

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Milicia excelsa (Welw.) C.C. Berg

Taxonomy and nomenclature

Family: Moraceae

Synonyms: *Chlorophora excelsa* (Welw.) Benth., *C. alba* A. Chev., *C. tenuifolia* Engl., *Maclura excelsa* (Welw.) Bureau, *Milicia africana* Sim, *Morus excelsa* Welw.

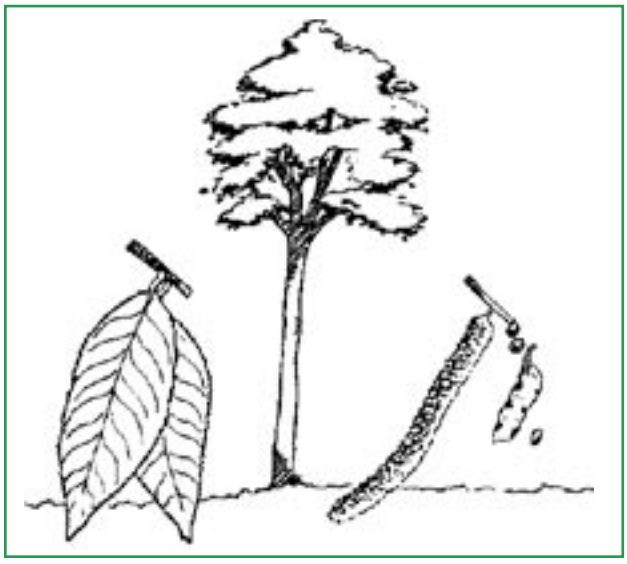
Vernacular/common names: ioko (Hausa); iroko (Yoruba); mvule (Swahili); rock-elm (Eng.); iroko (trade name).

Related species of interest: the two African *Milicia* species, *M. excelsa* and *M. regia* are known together as iroko and logging companies do not distinguish between the two. *M. regia* has a more western distribution, occurring from Senegal to Ghana. Where the two species overlap, hybridisation may take place.

Distribution and habitat

Widespread in tropical Africa from Guinea-Bissau to Mozambique where it is found in lowland rain forests and wetter savannah woodland areas. It can grow with about 700 mm rain/year provided it has access to a supplementary source of water and it tolerates a wide range of soil types but not impeded drainage and waterlogging.

The species suffers from heavy exploitation, and on the IUCN Red List it is considered close to qualifying for 'vulnerable'. East Africa was once a major source of the timber, which was used as a teak substitute until supplies became short. West Africa continues to export large quantities.



Leaves, tree habit, male spike, fruit and seeds. (Hines and Eckman 1993).

Uses

With wood that is equivalent in value to teak, *M. excelsa* is one of the most important timber trees of tropical Africa. The heartwood is durable, workable and resistant to termites and marine borers. It is also extremely resistant to preservative treatments whereas the sapwood is permeable. The gravity is about 0.55 g/cm^3. It is mainly used for outdoor construction work, furniture, boats, cabinet-work, panelling, frames and floors.

The bark, its ashes, leaves and latex are used in local medicine and the trees play a major role in many local cultures where they are considered sacred, or parts of the tree serve ceremonial purposes. The leaves are edible and are used as mulch. It is often planted as a shade tree and along roads as an ornamental.

Saplings and mature trees are used for temporary and permanent shade for cocoa. Due to its open canopy structure, it allows adequate aeration and sunlight to reach crops beneath its canopy. It also maintains enough foliage in the dry season, which reduces excessive desiccation of cocoa.

Botanical description

Deciduous tree up to 50 m tall and with a diameter up to 10 m. The bole is straight and cylindrical, branchless up to 20 m or more. Bark is dark, fairly rough and flaking off in small scales but rarely fissured. When cut, the slash exudes white latex. The crown is umbrella-shaped and fairly flat at the top. Leaves simple and alternate, 10-20 cm long. Young leaves are velvety and with serrate margins while older leaves are glabrous and have entire margins.

The species is dioecious and male and female trees are slightly different in appearance, male trees having longer and more slender trunk and crown and forking being more common in male than in female trees. Flowers are born in single spikes; male flowers white, closely crowded in a slender, pendulous catkin up to 20 cm long; females greenish, in a shorter and wider spike that looks hairy from the projecting styles.

Fruit and seed description

Fruit: the fruit is a syncarp, i.e. the entire female inflorescence forms one aggregate structure consisting of small nutlets surrounded by the fleshy perianth. The fruit is green, 5-7.5 cm long, 2.5 cm thick, wrinkled and fleshy and resembling a fat green caterpillar.

There are about 70 seeds per fruit.
Seed: small and light brown, about 1.5 mm long and 1.0 mm wide. It is thinner at the scar end and has a thin seed coat. There are 400,000-500,000 seeds per kg.

Flowering and fruiting habit

Flowering generally takes place at the end of the dry season after the trees have shed the leaves or with the new leaves. Male trees often set flowers before female and normally male trees flower every year whereas some female trees only flower every two years. After pollination, which is by wind, the fruits take 5-6 weeks to mature. The ripe fruits are dispersed by bats, birds and squirrels that readily eat the fruits.

Harvest

The fruits have a short ripening period and once ripe they fall to the ground where they begin to ferment immediately and timing of the seed collection is crucial. During the flowering season it is advisable to record the sex of the trees in the seed source in order to facilitate seed collection.

The fruits do not change colour during maturation and a cutting test is necessary to determine maturity. When the seeds are mature, the fruit pulp softens and the endosperm inside the seed is white and firm.

Collection is best done from the tree by cutting down small twigs with fruits. If the fruits are collected from the ground, it must be done daily and on tarpaulins.

As the fruits begin to ferment rapidly, they will not tolerate temporary storage and must be transported to the processing site as quickly as possible. During transport the fruits should be kept in open bags and with only small amounts in each bag. The bags should be protected from direct sun and, to avoid overheating, must not be stacked or packed tightly .

Processing and handling

At the processing site the fruits are spread out in a single layer, preferably on a rack to allow air circulation. If the seeds are not fully mature, they are left in the shade for a few days to after-ripen. Fully mature seeds should be extracted immediately.

To remove the pulp, seeds are soaked in water for about one day and then macerated by hand. Empty seeds float on the water but some report that so do many viable seeds and that this method is not recommendable. Pulp and other impurities are removed by skimming. Depulping can also be done in a depulper, seed thresher or in a cement mixer where seed and gravel are mixed 2:1. About 40 kg fruit produces 1 kg clean seed.

When the seeds are completely clean, they are dried in the shade for a few days in a well-ventilated place. To absorb excess water the seeds are best dried on a piece of plywood or paper. During drying, the seeds must be turned from time to time and the board or paper under the seeds changed when wet.

Storage and viability

The seeds are tolerant to desiccation and low temperatures. If dried to 8% moisture content or less and stored in airtight containers at 0-5°C, full viability can be retained for at least one year.

However, storage of this species can be problematic and when possible, the seeds should be sown within one year of collection.

Dormancy and pretreatment

The seed is not dormant and pretreatment is not necessary.

Sowing and germination

The seeds are sown in a seedbed and transplanted to containers after three weeks. Germination is usually good, attaining about 30% after two weeks and 60-90% after four weeks. The germination percentage depends largely on the number of empty seeds. In the nursery the seedlings must be grown under shade cloth or screen to be protected from attacks by gall-forming psyllids.

After about four months when the seedlings are 30 cm tall, they are ready for planting in the field. Stumps (27 cm root length, 2 cm diameter) or striplings (2.4 cm tall) are generally transplanted in the field but in some places the most common technique is to plant in plastic bags.

It is found that constant temperature as well as complete darkness retard germination and if the germination test is carried out in a cabinet, it should be under fluctuating temperature and light regimes.

Selected readings

Hines, D.A. and K. Eckman. 1993. *Indigenous multipurpose trees of Tanzania: uses and economic benefits for people*. Cultural Survival and Development Foundation of Tanzania

Keay, R.W. 1989. *Trees of Nigeria*. Clarendon Press Oxford, U.K.

Luemba, C. 1999. *Description and collection of Milicia excelsa in Angola*. Tree Seed News, Sep. 1999. Southern African Development Community.

Msanga, H.P. 1998. *Seed Germination of Indigenous Trees in Tanzania*. Canadian Forest Service, Northern Forestry Centre, Edmonton, Canada.

Schaefer, C. and Z.V. Siva. 1990. *Recommendations for the Collection, Processing and Storage of Chlorophora excelsa Seed*. Kenya Forestry Research Institute, Technical Note No. 13. Kenya.

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